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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,848	09/06/2003	Ka-Ngo Leung	IB-1826A	8582
8076	7590	02/01/2006	EXAMINER	
LAWRENCE BERKELEY NATIONAL LABORATORY ONE CYCLOTRON ROAD, MAIL STOP 90B UNIVERSITY OF CALIFORNIA BERKELEY, CA 94720			DHINGRA, RAKESH KUMAR	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/656,848

Applicant(s)

LEUNG ET AL.

Examiner

Rakesh K. Dhingra

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure was objected to because of the following informalities:

Page 8, line 4: it is suggested to change "62" to "60".

Applicant's amendment to specification in page 8, line 4 has been noted. Applicant is invited to clarify why this objection is traversed since no reasons for traverse have been given by the applicant.

Response to Arguments

Applicant's arguments on pages 10-12 of Remarks/Arguments, filed 10/11/05, with respect to the rejection(s) of claim(s) 1-12 under 35 USC 103 (a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made as explained below:

First Claim rejections under 35 USC 103 (a)

Rejection of claims 1, 4, 8, 11 – new reference by Miley et al (US Patent No. 6,777,699) has been found which in combination with Whealton et al (US Patent No. 4,602,161) reads on the claims' limitations. Accordingly these claims have been rejected under 35 USC 103 (a) as explained below.

Second Claim rejections under 35 USC 103 (a)

Rejection of claims 1, 4, 8 – new reference by Miley et al (US Patent No. 6,777,699) has been found which in combination with admitted prior art reads on the claims' limitations. Accordingly these claims have been rejected 35 USC 103 (a) as explained below.

Dependent Claims

Dependent claims 2, 3, 5-7, 9, 10, 12 have also been rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, 8, 11 are rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US patent No. 4,602,161).

Regarding Claim 1: Miley et al teach an ion source (Figure 1) that comprises:
a source chamber 22;

an RF antenna 52 mounted external to the chamber;

an RF power source 54 coupled to the RF antenna for generating a plasma containing positive ions in a gas in the source chamber;

Miley et al also teach that the apparatus can be used for plasma processing in semiconductor applications (Column 2, lines 40–65 and Column 12, lines 10-55).

Miley et al do not teach converter for producing negative ions.

Whealton et al (US patent No. 4,602,161) teach an apparatus (as per Figure) that uses a converter plate 7 mounted in a plasma source, for generating negative ions by surface ionization of positive ions and that is negatively biased with reference to housing 9 (Column 2, lines 30-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use converter for generating negative ions as taught by Whealton et al in the apparatus of Miley et al to enable generate negative ion beam with low divergence (Column 1, lines 25-32).

Regarding Claim 4: Miley et al teach that the apparatus of invention could be used for sputtering by argon plasma (Column 12, lines 10-35).

Regarding Claim 8: Miley et al teach (Figure 1) that the ion source comprises:

an extraction aperture 99;

a pair of spaced concentric rings (extraction electrodes) 92, 96 (Figure 6 and Column 5, lines 50-65) mounted at the aperture.

Regarding Claim 11: Whealton et al teach that the converter 7 has a spherical surface such that the configuration of electrodes and relative spacing produces a focused negative ion beam at exit slit 31 (Column 3, lines 5-30).

Claim 2 is rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US patent No. 4,602,161) as applied to Claim 1 and further in view of Srivastava et al (US patent No. 6,761,796) and Leung et al (US Patent No. 5,198,677).

Regarding Claim 2: Miley et al in view of Whealton et al teach all limitations of the claim except that chamber is made of quartz and the quartz tube is mounted between a pair of end plates.

Srivastava et al teach a plasma apparatus (Figure 1) that includes a plasma tube 32 that is made of quartz (Column 4, lines 1-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use plasma tube made of quartz as taught by Srivastava et al in the apparatus of Miley et al in view of Whealton et al to enable transparency to higher frequency electromagnetic waves.

Miley et al in view of Whealton et al and Srivastava et al do not teach quartz tube (chamber) mounted between pair of end plates.

Leung et al teach an apparatus (Figure 1) that uses mounting plates 31 for mounting the source chamber 11 (Column 3, lines 30-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use end plates as taught by Leung et al in the apparatus of Miley et al in view of Whealton et al and Srivastava et al for mounting the source chamber.

Claim 3 is rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US Patent No. 4,602,161) as applied to claim 1 and further in view of Shindo et al (US Patent No. 6,511,575).

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Regarding Claim 3: Miley et al in view of Whealton et al teach all limitations of the claim except for material of the converter. Whealton et al further teach cesium as the converter surface 7 to generate negative ions (Column 2, lines 60-67).

Shindo et al teach an apparatus (Figure 11) that uses a negative ion generation conversion portion (converter) 47 made from group of compounds including Lanthanum Hexaboride, LaB.sub.6 (Column 14, lines 53-68 and Column 15, lines 1-6).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use converter made from lanthanum hexaboride (LaB.sub.6) instead of using cesium layer to generate negative ions in the apparatus of Miley et al in view of Whealton et al (Column 14, lines 40 to Column 15, line 5).

Claim 5 is rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US Patent No. 4,602, 161) as applied to claim 1 and further in view of Hashimoto (JP2000133497A)).

Regarding Claim 5: Miley et al in view of Whealton et al teach all limitations of the claim and also teach a shield 56 that is mounted outside the chamber.

Miley et al in view of Whealton et al do not teach shield mounted in the source chamber.

Hashimoto teaches an apparatus (Figure 1) that uses a cylindrical shield 29 mounted inside chamber wall 2 to improve reliability of operation (Paragraphs 0030, 0037).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use shield as taught by Hashimoto in the apparatus of Miley et al in view of Whealton et al to protect discharge chamber 27 from heat of plasma (Paragraph 0037).

Claim 6 is rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US Patent No. 4,602,161) and

Hashimoto (JP2000133497A) as applied to claims 1, 5 and further in view of Forster et al (US Patent No. 5,763,851).

Miley et al in view of Whealton et al and Hashimoto teach all limitations of the claim except for slots in the shield.

Forster et al teach an apparatus (Figure 5) that has an inner shield 350 having a plurality of slots 352 extending the length of the shield (Column 8, lines 21-30) to enable RF energy generated by coil to couple with plasma in the chamber (Column 2, lines 5-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have slots in the shield as taught by Forester et al in the apparatus of Miley et al in view of Whealton et al and Hashimoto to enable RF energy generated by coil to couple with plasma in the chamber.

Claim 7 is rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US Patent No. 4,602, 161) as applied to claim 1 and further in view of Chu et al (US Patent No. 6,228,176).

Regarding Claim 7: Miley et al in view of Whealton et al teach all limitations of the claim except for material of the RF antenna.

Chu et al teach an apparatus (Figures 1, 8) that uses RF antenna 46 made of copper tubing (Column 8, lines 14-17).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use RF antenna made from copper tubing as taught by Chu et al in the apparatus of Miley et al in view of Whealton et al to obtain RF antenna with minimum resistance.

Claims 9, 10 are rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US patent No. 4,602,161) as applied to Claim 8 and further in view of Roberts et al (US Patent No. 5,581,156).

Regarding Claims 9, 10: Miley et al in view of Whealton et al teach all limitations of the claims except magnetic filter and electron separator magnets.

Roberts et al teach an ion source apparatus (Figure 2) that includes a discharge chamber 40, extraction aperture 70, filter magnets 52 and a pair of spaced optics (includes magnets) 92, 94 positioned after the extraction electrodes 50, 80 (Column 6, lines 1-30 and Column 7, lines 45-60). Roberts et al do not specifically teach that these magnets 92, 94 deflect electrons, which would be an intended use.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use magnetic filter and separator magnets as taught by Roberts et al in the apparatus of Miley et al in view of Whealton et al to enable focus and transport the ion beam for high energy applications (Column 6, line 1 to Column 7, line 65) provide a semiconductor device plasma processed uniformly over the entire surface.

Regarding intended use it has been held by courts (Case law):

“A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).”

“It is well settled that the intended use of a claimed apparatus is not germane to the issue of the patentability of the claimed structure. If the prior art structure is capable of performing the

claimed use then it meets the claim. *In re Casey*, 152 USPQ 235, 238 (CCPA 1967); *In re Otto*, 136 USPQ 459 (CCPA 1963).”

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). Apparatus claims cover what a device is, not what a device does *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990)”.

Claim 12 is rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of Whealton et al (US Patent No. 4,602,161) as applied to Claim 1 and further in view of admitted prior art, Druz et al (US patent No. 6,464,891) and Shindo et al (US Patent No. 6,511,575).

Regarding Claim 12: Miley et al in view of Whealton et al teach all limitations of the claim except operating parameters.

As regards converter bias, admitted prior art teaches converter bias voltage range from 0.5 to 1.0 kV (Page 2, line 17).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use operating parameter like converter bias voltage as taught by admitted prior art in the apparatus of Miley et al in view of Whealton et al.

Power and gas pressure pertain to operating parameters and are considered as process limitations. Apparatus of prior art as disclosed is capable of being operated under conditions recited in the claim.

In this regard, it has been held by courts (Case law) that:

“A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art

apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).”

“Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). Apparatus claims cover what a device is, not what a device does *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990)”.

Further Miley et al teach that apparatus (Figure 7) operates at 250 W, but do not teach that ion source operates at 300-800W.

Druz et al teach an apparatus (Figures 1-3) that includes RF ion beam source 10 and where the RF power can range from 350 W to 1000W depending upon process conditions (Column 3, lines 40-50 and Column 8, line 55 to Column 10, line 55).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use RF power of 300-800 W as taught by Druz et al the apparatus of Miley et al in view of Whealton et al as per process requirements.

As regards gas pressure, Miley et al teach gas pressure of 0.4 to 2 mTorr, but do not teach gas pressure from 8-10 mTorr. Even though plasma ion sources with magnetic filter normally operate under low pressure, gas pressure of 8-10 mTorr is considered as process limitation.

Further, it has been held by courts (Case law) that:

“It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).”

“It would have been obvious to one having ordinary skill in the art to have determined the

optimum value of a cause effective variable such as [spray droplet size] through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).”

“Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process parameters through routine experimentation in the absence of a showing of criticality. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).”

Further, Shindo et al teach a plasma apparatus (Figures 1, 11) that uses a pressure range of 1 Pa to 7 Pa (7.5 mTorr to 52 mTorr), which includes the pressure range of 8-10 mTorr, for processing wafers to suppress damage due to charging (Column 7, lines 1-5 and Column 3, lines 15-18).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the gas pressure as per process limitations.

Claims 1, 4, 8 are rejected under U.S.C. 103(a) as being unpatentable over Miley et al (US Patent No. 6,777,699) in view of admitted prior art.

Regarding Claim 1: Miley et al teach an ion source (Figure 1) 22 that comprises:

a source chamber 22;

an RF antenna 52 mounted external to the chamber;

an RF power source 54 coupled to the RF antenna for generating a plasma containing positive ions in a gas in the source chamber;

Miley et al also teach that the apparatus can be used for plasma processing in semiconductor applications (column 2, lines 40–65 and Column 12, lines 10-55).

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Miley et al do not teach converter for producing negative ions.

Admitted prior art teach an apparatus that uses a converter (Page 2, lines 13-20) mounted in a plasma source, for generating negative ions by surface ionization of positive ions and that is negatively biased with reference to plasma and ion source walls.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use converter as taught by admitted prior art in the apparatus of Miley et al to generate negative ions.

Regarding Claim 4: Miley et al teach that the apparatus of invention could also be used for sputtering by argon plasma (Column 12, lines 10-35).

Regarding Claim 8: Miley et al teach (Figure 6) that the ion source comprises:

an extraction aperture 99;

a pair of spaced concentric rings (extraction electrodes) 92, 96 (Figure 6, lines 50-65) mounted at the aperture.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29

USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1) Claims 1, 4 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4 of U.S. Patent No. 6,768,120 in view of Whealton et al (US patent No. 4,602, 161).

Claim 1 of patent recites a plasma ion source comprising:

A source chamber;

An RF antenna mounted external to the chamber for producing a plasma inside the chamber; though claim 1 of the patent does not explicitly recite an RF source coupled to RF antenna for generating a plasma containing positive ions, but generating plasma in the chamber through RF antenna would inherently require a RF source. Also plasma would normally include positive ions. Further Claims 1 of patent does not specifically recite plasma ion source for producing negative ions, but rather recites an ion source,

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which could include negative ions also. Claim 1 of the patent is narrower than claim 1 in the application and thus anticipates the claim in the application.

Claim 1 of the patent does not recite a converter for producing negative ions.

Whealton et al (US patent No. 4,602,161) teach an apparatus (as per Figure) that uses a converter plate 7 mounted in a plasma source, for generating negative ions by surface ionization of positive ions and that is negatively biased with reference to housing 9 (Column 2, lines 30-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use converter for generating negative ions as taught by Whealton et al in the apparatus as per claim 1 of Patent No. 6,768,120 (Leung et al) to enable generate negative ion beam with low divergence (Column 1, lines 25-32).

Claim 4 of patent recites that chamber contains argon, that is, the apparatus creates argon plasma as recited in claim 4 of the application.

2) Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 7 of copending Application No. 2003/0218430 (Leung et al) in view of Whealton et al (US patent No. 4,602, 161).

Claim 7 of co-pending application patent recites a plasma ion source comprising:

A source chamber;

An RF antenna mounted external to the chamber;

An RF power source coupled to the RF antenna.

Although claim 7 of the co-pending application does not specifically recite plasma ion source for producing negative ions, but rather recites an ion source, which could imply ion source for producing negative ions also. Further claim 7 of the co-pending

application does not explicitly recite generating plasma containing positive ions, but a plasma would normally include positive ions also. Claim 7 of the co-pending application is narrower than claim 1 in the application and thus anticipates the claim in the application.

Claim 7 of the co-pending application does not recite a converter for producing negative ions.

Whealton et al (US patent No. 4,602,161) teach an apparatus (as per Figure) that uses a converter plate 7 mounted in a plasma source, for generating negative ions by surface ionization of positive ions and that is negatively biased with reference to housing 9 (Column 2, lines 30-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use converter for generating negative ions as taught by Whealton et al in the apparatus as per claim 7 of co-pending application No. 2003/0218430 (Leung et al) to enable generate negative ion beam with low divergence (Column 1, lines 25-32).

This is a provisional obviousness-type double patenting rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tokoro et al (US Patent No. 5,162,699) teach an ion source (Figures, 2, 3) that uses a boron compound (LaB.sub.6) component 21, 22 at a suitable location inside the arc chamber and operates on the principle of ion production using hot cathode to produce hot electrons and increase yield of boron ions. (Abstract, Column 2, lines 55-60 and Column 3, lines 1-5).

Chen et al (US Pub. No. 2002/0072016) Chen et al teach a plasma apparatus (Figure 2, 3) that operates at RF power level of 200-2000 W to reduce the need to expose the substrate to a wet solvent (Paragraphs 0007, 0030).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh Dhingra



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